The MAC Flyer

JUNE 1975

MAC CREWS WHO SAID NO . PAGE 3.

The MAC Flyer

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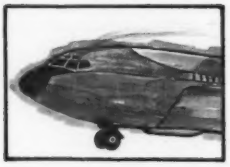

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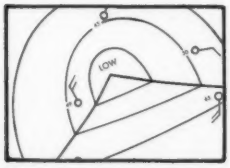

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Flyer Call

Some of our readers have asked how we choose recipients for the "Good Show" award featured in THE MAC FLYER. The answer is that they are chosen here at the MAC Safety Directorate on the basis of professional performance by a flight crew or individual during emergency situations. Normally, these actions are brought to our attention through accident or incident reports. We also monitor nominations for the MAC Distinguished Individual Safety Award for "Good Show" candidates.

But the Air Force "Well Done"award is altogether different from the MAC award, although the basis of selection for each is similar. The "Well Done" award provides official Air Force recognition to personnel who, by performing outstanding feats of airmanship or support to aircrews, have averted a serious aircraft accident. MAC nominations for this award must be sent through command channels to this office for major command indorsement. From here they are forwarded to the Air Force Inspection and Safety Center at Norton. Procedures are outlined in AFR 900-26. The "Well Done" award pictorial presentation is published in an **Aerospace Safety** Magazine "Well Done" feature.

The intent of both the "Well Done" and the "Good Show" is to recognize professional performers, and those chosen to receive either award have earned it.

NO MAC Crews Who Said

Not enough can be said for the professional accomplishments of air traffic controllers in high density areas. But occasionally they make mistakes, and aircrew vigilance must take up the slack.

Air traffic in many terminal areas of the world is routinely positioned and guided safely to touchdown by the modern miracle of radar. Invisible lines of communication between radar controllers and pilots and between aircraft transponders and ATC radar scopes have formed aeronautical bonds of faith, reliance, and trust.

But behind the radar scopes are professionals who suffer from the weakness that affects all of us — the human tendency to err. Thus errors can result in descent clearances below minimum safe altitudes, transmissions issued to one aircraft but intended for another, mistaken radar vectors, and pilot-controller misunderstandings.

Crew vigilance is the last line of defense, the last link in the system of checks and balances in the sky. But years of total reliance and conditioning to the soothing response "radar contact" sometimes blank out this critical safety factor. Many MAC aircrews at one time or another have detected ATC deficiences that could have led to mid-air collisions or contact with the ground. Today's MAC aircraft are sophisticated and reliable, and the ATC environment in which they operate is, for the most part, equally sophisticated and responsive. But in spite of the technological evolution in these areas, technology has not been able to eliminate error. This fact alone must stimulate and reaffirm aircrew awareness to scrutinize all clearances, radar vectors, aircraft position, and terrain ahead and below. If there is the slightest doubt, say no! — to the controller issuing the clearance.

"Crew vigilance is the last line of defense, the last link in the system of checks and balances."

The Answer Is No

There are many cases in which MAC aircrews did detect, recognize, and said "no" to erroneous ATC directions. Here are six potential air disasters that were averted in this manner by alert MAC aircrews in the last eight months. Hazard reports were submitted in each case.

A C-141 crew, flying over mountainous terrain in South America, received clearance to descend to flight level 180. Checking their en route maps for terrain clearance and minimum en route altitudes, the crew declined descent and maintained flight level 240 until their flight position permitted safe descent.

During a missed approach over an island base in the Aleutians, a C-141 crew received erroneous missed approach instructions. The crew declined the controller's instructions that would have caused the Starlifter to fly into the side of a mountain.

Approaching a destination airport in Africa, a C-141 crew received clearance to descend from flight level 350 to 5,000 feet.

Checking minimum en route altitudes, the crew confirmed a published 6,000 feet MEA and declined descent to 5,000 feet, leveling off instead at 6,000.

Although 5,000 feet would have cleared terrain, it would only have been by a 600-foot margin.

Again, in South America, an en route controller cleared a C-141 to flight level 180 over mountainous terrain. The MAC crew declined descent to 180 and maintained flight level 240 until they reached a position where they could execute a safe approach. Had the original approach been complied with, the aircraft would have impacted a mountain 21,000 feet high.

A C-9 crew initiated a missed approach at a base on the fringe of the Rocky Mountains. A misunderstanding during communications between the controller and crew could have resulted in the aircraft's flying 2,000 feet below the required missed approach altitude. Questioning the controller's instructions and altitude acknowledgement, the alert C-9 crew continued climbing to a safe altitude. Terrain contact could have resulted if the crew had complied with the misunderstood clearance.

Nearing their destination at a Far East airport, a C-141 crew received clearance to descend from 8,000 feet to 6,000 feet. The navigator alerted the pilots to mountainous terrain in excess of 6,000 feet on the descent course. The crew remained at 8,000 feet and attempted clarification with the controller. Twice the controller directed descent, but the crew maintained altitude. Had the clearance been followed, the aircraft would have hit the mountain.

These are not the only incidents. During 1974 and the first three months of 1975, MAC crews submitted 41 hazard reports concerning near misses or instances which might have led to terrain contact. These incidents verify that heads-up pilotage by MAC aircrew members is required during all phases of flight — and particularly during arrival and departure phases. The controller and pilot should have a mutual respect as members of a professional team, but both must maintain vigilance for error.

"Had the original clearance been complied with, the aircraft would have impacted a mountain."

Who's Minding

by Capt Allan K. MacAulay
1550 TTS
Hill AFB, Utah

After an exhaustive examination of the wreckage, the investigating team still had not determined what caused the crash of a multi-million dollar aircraft. Weeks of sifting wreckage and an in-depth study of the crew's background and experience had produced nothing to help determine the cause. The only abnormal finding was that the AFCS (automatic flight control system) servos had been turned off. No one knew why.

What had caused this crash? Had a flight recorder been on board, it would have played back the following scenario.

Jolly 99 was in a holding pattern at 1,800 feet, IFR and on the initial outbound leg. The copilot was flying the aircraft while the pilot briefed for the instrument approach.

Copilot: "Turning right inbound."

Pilot: "It's a left turn."

Copilot: "No, we're in holding."

Pilot: "Let me check — oh, yes, I've got it." (Meaning yes, I see that a right turn is correct.)

Copilot: "Roger, you've got it." (Meaning you've got the controls.) No visual confirmation.

The aircraft was now tilted in a standard right turn, trimmed, flying itself with no one monitoring the controls.

Flight mechanic: "Shouldn't someone be on the controls?"

The pilot, suddenly realizing that no one was flying the aircraft, grabbed the controls, released the trim, and proceeded to put the aircraft through several severe maneuvers in the weather.

Pilot: "I think there's an AFCS problem. Shut the servos off!" (There had been no malfunction, but the copilot dutifully shut off the AFCS.)

Now that the automatic flight control system was off, the pilot had even more difficulty flying the aircraft. The plane gyrated wildly and bank angles exceeded 90 degrees. Although it was obvious that the pilot was losing control of the aircraft, the copilot made no attempt to take the controls. The perfectly operating aircraft spiraled down from 1,800 feet and crashed.

This episode actually occurred — or, rather, the in-flight portion did — during a helicopter simulator flight at Hill AFB, Utah. The pilots were qualified crew members attending the annual HH-53C simulator refresher course.

Crew coordination, or rather the lack of it, caused this mishap. Let's recap with a slow playback of the sequence of events.

The copilot was flying the aircraft when the two pilots began discussing which way to turn inbound

The warden said it to Cool Hand Luke: "What we have here is a classic failure to communicate." But for aircrews, cockpit communications should convey mutually understood meanings.

the Store?

to the holding fix. The pilot responded, "I've got it," meaning I now understand which way to turn. The copilot, thinking the pilot now had the controls, released the cyclic and collective, responding, "Roger, you've got it," but he did not visually confirm that the pilot was in fact flying the aircraft.

When the flight mechanic announced that no one had control of the aircraft, the pilot panicked and grabbed the controls. Misinterpreting his control and performance instruments, he put the machine through a series of unusual attitudes. By this time the copilot was assuming the role of a spectator. His final role as copilot was played when he turned off the AFCS servos upon the pilot's request. But when it became obvious that the pilot was not in command of the situation (disoriented and probably experiencing vertigo), the copilot made no attempt to take control. He sat there quietly, waiting for the inevitable.

Only a simulator flight? True, but how many scenes like this have actually been played out to their tragic conclusion? Probably many. A forgotten detail, a misspoken word, or a misinterpreted gesture may prove disastrous without the presence of that essential ingredient known as crew coordination. With it you may be just another crew, flying your missions without fanfare or praise. But take a minute to consider the alternative.

ABOUT THE AUTHOR

Born in Sydney, Nova Scotia, Captain MacAulay moved to California when he was 16 and became a naturalized citizen in 1964. After graduation from the University of California at Davis, he received his commission through Officers Candidate School. Completing pilot training at Reese AFB in 1968, Capt MacAulay has since accrued over 1,000 hours in the C-141 and flown a combat rescue tour in Southeast Asia in HH-53 helicopters. For the past three years, he has served as an HH-53 IP/FE at Hill AFB and is currently a simulator instructor there. He has over 1,300 hours in the HH-53.

Captain Kent and Crew

GOOD SHOW

Left to right: Capt Dennis M. Kent, aircraft commander; SSgt Homer W. Perry, flight mechanic; Capt Arthur K. Poe, copilot (AC qualified); TSgt Louis E. Boos, instructor flight mechanic.

After executing a practice approach and a full stop taxi-back landing, Captain Kent, the aircraft commander, and Captain Poe exchanged seats and prepared their C-7 Caribou for another takeoff. During the subsequent takeoff roll, with Captain Kent in the right seat, the nearly grossed out Caribou accelerated normally down the runway and lifted off. As the landing gear retracted, number two engine began backfiring severely. The engine instruments confirmed a partial power loss. Struggling with the controls, both pilots managed to minimize altitude loss and yaw. Captain Kent elected to keep number two engine in operation. Loss of either engine near the ground by a Caribou in max power flight is an extremely critical emergency condition due to high minimum control airspeed requirements.

As the pilots struggled to maintain aircraft control, the flight mechanic reported number two engine awash in flames. But the aircraft was still too close to the ground to permit safe single engine operation. After a gradual climb to about 500 feet above the ground, the pilots declared an emergency and requested clearance for an immediate landing. Upon reaching a safe altitude, they shut down the burning engine and discharged the fire bottle. But the engine continued burning. After a second fire extinguisher bottle was discharged, the fire finally dissipated.

With part of their in-flight emergency taken care of, Captain Kent concentrated on a single engine emergency return. Less than five minutes from initial takeoff, the charred Caribou landed without further incident, and the four crew members and 13 aeromedical technicians aboard deplaned without injury. The exceptional skill, correct analysis of the situation and prompt action by Captains Kent, Poe and crew and their knowledge of C-7A aircraft systems and checklist procedures, prevented a serious aircraft accident and possible loss of life. THE MAC FLYER is proud to offer its traditional "Good Show" to Capt Dennis M. Kent and crew of the 700th Tactical Airlift Squadron (AFRES), Dobbins AFB, Ga.

Mishap with a Moral:

Acid in the Hold

This story is true. It is about a commercial cargo flight that had been loaded with dangerous cargo without the crew's knowledge. Their reaction to an in-flight problem in the cargo compartment is something all crews should reflect upon.

The three crew members methodically progressed through their checklists in preparation for flight. Their big jet contained 53,000 pounds of cargo — thought by the crew to be general freight and mail. They did not know that on board their aircraft was 15,000 pounds of hazardous cargo (as defined in AFM 71-4), including nitric acid. The crew got clearance for takeoff and started an airborne sequence of events which would, an hour and a quarter later, terminate in disaster.

Twenty-five minutes after takeoff the aircraft was level at flight level 330. As the crew squared away the cockpit for the long overwater flight, smoke slowly began seeping into the flight deck. Searching for the source of smoke, the crew decided it was coming from the lower electronic compartment below the cockpit.

They were unaware that the smoke was actually emanating from the cargo and that the airflow was carrying it forward into the lower electronic compartment. So they continued to try, and failed, to isolate the suspected faulty electronic gear. The captain informed company operations at the departure airport of the problem and of his intention to bring the aircraft back.

A short time later the crew advised operations that the smoke seemed to be "getting a little thicker in here." The captain then changed his plan and requested center clearance to the nearest airport that had "company" maintenance. He informed operations that he was diverting and said the "cockpit's full back there."

Air traffic control cleared the pilot to turn around and to descend to a lower altitude to burn off excess fuel for landing. Inbound to the diversion airport, as they flew past an Air Force base, the crew requested their distance from their destination, adding that "the DMEs don't seem to be working." Radar plotted the aircraft between 40 and 45 miles from the diversion airport.

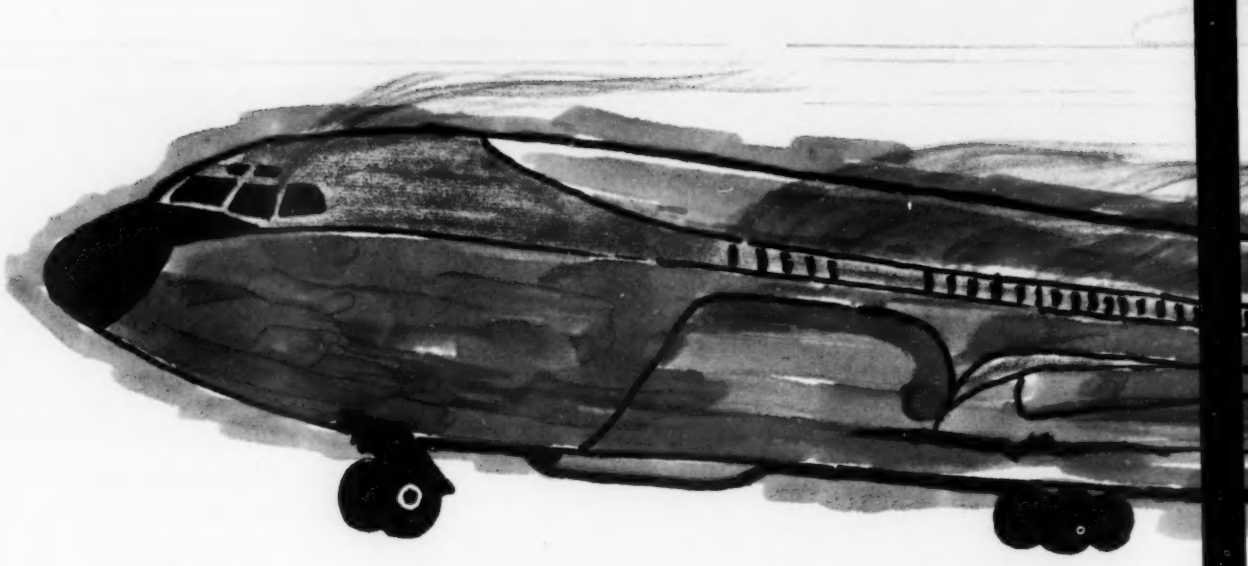
Center handed the flight off to arrival radar; the arrival controller cleared it to the airport at 2,000 feet and asked if the crew was declaring an emergency. The reply was " . . . negative on the emergency . . . ." The captain told his crew to "shut down everything you don't need." He still believed the source of smoke was electrical.

As the flight engineer followed his checklist he repositioned the essential power switch to "external power." By doing so, he shut down the yaw damper. Although he still did not declare an emergency, the captain by now probably was becoming more concerned with the situation for, when the controller asked if he wanted an extended traffic pattern, the reply was, "Negative, we want to get it on the ground as soon as possible."

Three minutes before the flight terminated, the controller stated, " . . . advise anytime you have the airport in sight." The crew made no further transmission. Receiving no response, the controller then transmitted, "If you read, squawk ident on any transponder. I see your transponder just became inoperative. Continue inbound . . . ." The controller cleared the flight "in the blind" to land.

The pilot apparently lowered flaps and extended spoilers (The National Transportation Safety Board reported that "there is evidence" that the spoilers were out). Witnesses watched the big jet approach the runway. As it descended for landing on final approach, the pilot's window opened and smoke began pouring from it. The aircraft began a series of roll and yaw maneuvers, which increased in severity. Then it assumed a final nose-up attitude followed by a near vertical nose-down attitude. The left wing

Acid in the Hold



and nose simultaneously struck the ground short of the runway, and the aircraft burst into flames.

The three crew members died in the crash.

Accident Analysis

The National Transportation Safety Board determined that the probable cause of the accident was smoke in the cockpit which was continuously generated and uncontrollable. The smoke led to an emergency situation that culminated in loss of control of the aircraft during final approach when the crew, in uncoordinated action, deactivated the yaw damper in conjunction with incompatible positioning of flight spoilers and wing flaps.

It was also determined that the dense smoke in the cockpit seriously impaired the flight crew's vision and ability to function effectively during the emergency. Although the source of the smoke could not be established conclusively, the Board believes that "the spontaneous chemical reaction between leaking nitric acid, improperly packaged and stowed, and the improper sawdust packing surrounding the acid" initiated the accident sequence.

A contributing factor was the general lack of compliance with existing regulations governing the transportation of hazardous materials. This, the Board said, resulted from the complexity of the regulations, the industry-wide lack of familiarity with regulations at the working level, the overlapping jurisdictions, and the inadequacy of government surveillance.

Cargo Load

The pilot was unaware that he was carrying over 15,000 pounds of hazardous cargo. (This may have been a reason that the crew continued to think the smoke was electrical.) Materials on board included: nitric acid, sulfuric acid, acetone, methanol, xylens, and isopropanal — all flammables. Regulations require that nitric acid bottles "be placed in tightly closed metal containers, and well cushioned therein on all sides with incombustible mineral packing material, such as whiting, mineral wool, asbestos, sifted ashes, etc." The nitric acid on the aircraft was found packed in wooden boxes and cushioned with sawdust. The boxes had no outside metal containers. Loading crews questioned later said some boxes similar to the nitric acid

boxes were lying on their sides on the aircraft.

There is reason to believe that the smoke became so dense that the pilot may have been unable to see his spoiler lever and subsequently forgot to disengage the spoilers when the flaps were down. And NTSB reported the pilot probably was not aware of the inoperative yaw damper.

The aircraft manufacturer warns that performance data show lateral control may be impossible on this type of aircraft when flaps are down, spoilers are out, and the yaw damper is inoperative.

Moral

One of the more obvious morals in this accident is that crews of transport aircraft should always know what they are hauling. But sometimes this knowledge is not easy to obtain. True, regulations require MAC aircraft commander and loadmaster briefings when hazardous cargo is aboard. But the thoroughness of these briefings may not always be what you, as a crew member, feel is sufficient. If they're not, request further information. Close aircrew surveillance during any loading operation provides an additional safety element for you and your crew. An unmarked piece of cargo or one that does not seem compatible with its label could spell danger. All of this falls under the heading of "responsibility" for MAC crews. If the load doesn't look as though it complies with the rules, don't take it until you ascertain that it is safe to do so.

Aircraft tech orders and other directives pretty well spell out the actions aircrews should take under most in-flight conditions. And the intent of these is that if you're having problems, get the aircraft on the ground. Sounds easy. Yet, a highly experienced crew on this aircraft didn't realize they were having serious problems until they had already overflown fields at which they might have landed.

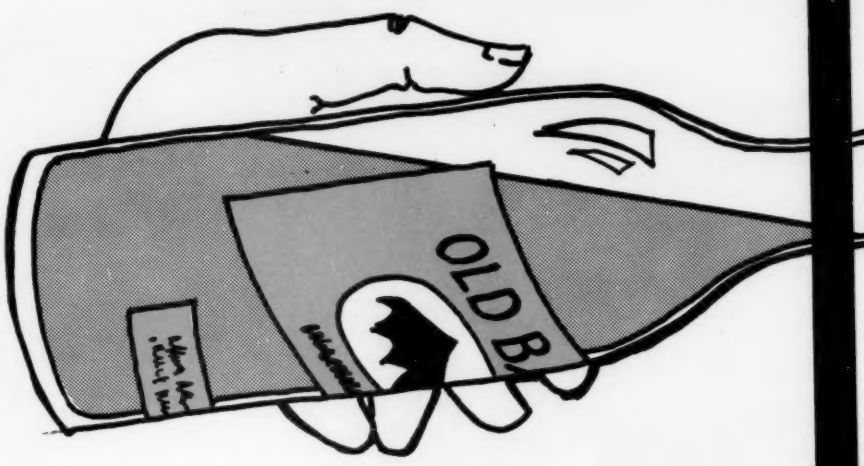
One of the first things a MAC pilot learns when he enters the command is that regardless of how small an in-flight problem may seem, it is never too soon to declare an emergency. But declaring one too late can be fatal. This is as true today as it was the first time you heard it.

Adapted from National Transportation Safety Board report number: NTSB-AAR-74-16.

THE HANGOVER

The old bod can hold a lot of "spiritus fermenti" but booze can only be metabolized at a given rate. This — and the morning-after effect — can create problems even for crews who follow the rules.

by Dr. (Capt) John A. Hensing, USAF
Flight Surgeon, USAF Clinic
Norton AFB, Calif.



One of the more popular topics of flyers' conversations is hangovers. What effect do hangovers have on flying safety? The answer is *a big effect!*

Alcohol consumed in large amounts can lead to decreased levels of pilot performance and, in turn, aircraft accidents. As a matter of historical fact the incidence of positive blood alcohol found in military flyers involved in aircraft accidents is extremely small.[1] On the other hand, many of us have observed crew members all too often flying with a "classical hangover" from having one too many the evening prior to a mission. The implication of having a few too many "toddies" is great because alcohol can have a detrimental effect on a crew member's reaction time and ability to remain mentally alert.

This article is designed to describe: (a) some significant short term effects of alcohol, (b) some mechanisms thought to be responsible for hangovers, and (c) some methods you can employ to minimize the symptoms of a hangover, thereby maintaining your best performance.

Short Term Effects

To begin with, let's review

HITCH

some of the short term effects of alcohol consumption. Alcohol is a drug and is classified as a central nervous system depressant. This means that alcohol will depress many of the normally activating and inhibitor centers of the brain. As a result of these brain center depressions, we can physiologically measure the effects by a slight drop in blood pressure, increases in reaction times, some slurring of speech, perhaps some loss of coordination, and staggering while walking or running. In addition, some of the inhibitor centers of the brain may also be depressed and result in some changes to your "normal behavior." Some very quiet persons may become noisy and aggressive under the influence of alcohol.

Another major short term effect of alcohol in the body is the altering of its fluid balance. Alcohol works indirectly upon the kidneys, forcing them to produce a very diluted urine — a urine which contains large amounts of water. This physiological mechanism leads to a loss of body water and dehydration. This state is manifested by a scorching thirst and a "cotton mouth" the morning after.

Why a Hangover

Clinical science still does not completely understand the aspects of hangover production, but we have identified three generally accepted mechanisms. The first of these mechanisms is dehydration, or loss of body water. As a result of this loss, the remaining solutes in body fluids become "concentrated." This concentration of solutes leads to symptoms of weakness, fatigue, irritability, and thirst.

Another major mechanism of hangover production is the organic impurities found in all alcoholic beverages. These impurities (aldehydes, ketones, etc.) are present in lesser amounts in the so-called "clear beverages" such as vodka and gin. These organic impurities are metabolized in the body in complex ways and, while present in the bloodstream, will manifest themselves by fatigue and general malaise.

A third and final mechanism is the presence of small amounts of residual alcohol in the bloodstream. Alcohol is almost entirely "broken down" or "metabolized" by the liver at a known set rate — approximately one ounce of 90 proof alcoholic beverage per hour. The liver metabolizes at this rate regardless how much alcohol is in the bloodstream. This is analogous to climbing a C-141 to cruise altitude and establishing a fuel flow for a constant airspeed. Not much can be done by the crew to alter this fuel flow to any great degree. This principle also holds true for your liver. You

can easily see that your liver may not be capable of "processing" all the alcohol delivered to it in a given period of time. For this reason the rule prohibiting drinking during the ten-hour period prior to reporting for flying will not always assure that the alcohol has been metabolized. A much better rule is to allow yourself more than ten hours. For example, if you drink three Manhattans (ten and one-half ounces of alcohol), you should allow your body at least ten to 11 hours to metabolize the alcohol.

How To Help

If you insist on drinking, then follow these suggestions for minimizing the alcohol's effect on your body and maximizing your performance.

Consider warding off hangovers by controlling your hydration. Right after you have returned from an outstanding party and prior to slipping off to the "land of nod," try drinking two, three, or even four glasses of water. This will partially replenish the water your body has already lost and will continue to lose during the time you're asleep.

There is no way you can prevent the consumption of the organic impurities in the alcohol you drank, but you can deal with some of their effects. Try taking some aspirin, tylenol, or other simple analgesics. If your stomach is upset from a combination of food and drink, an antacid preparation may decrease the irritation to your stomach. Even though you don't feel hungry it may help if you eat something. Large quantities of coffee or tea that contain caffeine are central nervous system stimulants and will tend to counteract some of the depressant effects of the alcohol. Bear in mind, however, that although coffee or tea makes you feel better, your liver continues to metabolize at the same constant rate.

Consider also the use of fructose. Fructose is a type of sugar that some researchers believe can help the body eliminate alcohol.[2] Try eating toast and honey or drinking a glass of tomato juice as an after-party snack.

Last, and most important, allow more time between your last drink and takeoff time. The longer you wait between drinking and flying, the safer your performance.

ABOUT THE AUTHOR

Dr. (Capt) John A. Hensing graduated from Iowa State University in 1968 and completed his medical training at the University of Iowa in 1972. After completing his internship at Maricopa County Hospital in Phoenix, Arizona, he attended the aerospace medicine course at Brooks AFB, Tex., in 1973. Since then, Dr. Hensing has been a flight surgeon at Norton AFB, Calif.

In closing, I want to mention some of the things which will not help you combat a hangover. Another drink or "the hair of the dog that bit you" will only dehydrate you further and depress your nervous system further. Your body will have to rid itself of even more organic impurities, and though your body will be temporarily lulled by the alcohol, the eventual hangover will be prolonged and more severe. Using 100 percent oxygen by mask does not counteract any of the metabolic defects created by the alcohol and therefore will really have no effect on the alcoholic symptoms. Remember, oxygen is used to prevent hypoxia or to avoid smoke and fumes; it has no effect on alcohol metabolism.

It is important to remember that none of these therapeutic suggestions will rid us of the morning-after problem. However, by understanding the implications and hazards of drinking and the treatment of alcoholic hangovers, you can help yourself avoid fatigue and, subsequently, make your flying safer.

My thanks to Maj Preston Wisner, USAF, MSC, USAF Clinic, Norton AFB, Calif., for his assistance in preparing this article.

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1. Zeller, Anchard F., Ph.D. "Alcohol and Other Drugs in Aircraft Accidents." Paper presented at Biannual Scientific Session of the Joint Commission in Aviation Pathology, Toronto, Canada, 17 Sep 74.
2. Brown, S. S., *et al. The Lancet,* pp 898-899, 28 Oct. 72.

Global Notes

award winners

MAC Distinguished Individual Safety Awards have been earned by the following crewmen for their professionalism during critical emergencies:

Capt Arthur W. Frey, Det 9, 37 ARRS, Whiteman AFB, Mo. — While flying a missile support mission, a high frequency vibration suddenly shook Captain Frey's TH-1F. Shortly thereafter, the speed-decreasing gearbox warning light illuminated, the SDG oil pressure dropped to zero, and engine r.p.m. became erratic. Realizing the gravity of the situation, Captain Frey executed an autorotation to a nearby field. There were no injuries to the passengers and no damage to the aircraft.

1st Lt Howard Stevens and Sgt Lawrence Jefferson, Det 1, 48 ARRS, Homestead AFB, Fla. — During a flightline briefing of dependent wives, Lieutenant Stevens' attention was diverted by abnormal sounds of a UH-1N that was hovering nearby. As the helicopter settled back onto the ramp, he and Sergeant Jefferson spotted flames coming from the right cowling area. The two men secured a fire extinguisher, positioned it close by the helicopter, and extinguished the fire. Their prompt response helped avert possible loss of crew and helicopter. Of particular note is that Sergeant Jefferson, an operations specialist, had little previous experience around aircraft but reacted to the emergency shortly after deplaning from the helicopter.

1st Lt Dan G. Driggs, 1st Lt Joseph E. Kane, Sgt Truman E. Amonett, A1C Kim N. Gregory, and A1C Stanley M. Domalewski, 31 ARRS, Clark AB, P.I. — Far out over the water on a drone recovery mission, a main transmission oil pressure line ruptured on this crew's HH-3, causing a total loss of quantity and pressure. Lieutenant Driggs immediately banked the crippled helicopter back toward shore and initiated an autorotational descent. Just after flying over turbulent surf and coral reefs short of the shore, number one engine unexpectedly failed. In spite of this added complication to an already critical emergency situation, Lieutenant Driggs successfully landed the helicopter.

436 MAW wins trophy

The winner of the MAC Commanders Trophy for Aircraft Maintenance during 1974 is the 436th Military Airlift Wing, Dover AFB, Del. The award was presented during the MAC Commanders Conference held in March 1975 at Scott AFB.

The award is made annually to recognize the outstanding MAC organization in maintenance accomplishments and management of aircraft maintenance resources.

A Case of Shear Trouble

What weather phenomenon is invisible, insidious, and can hammer the mightiest jet to earth in seconds? Here is a discussion of one of the deadliest enemies that aircrews face.

by Maj A. R. Barbin
Associate Editor

Hazardous weather phenomena that can be detected visually or electronically can be avoided. But an invisible hazard as treacherous to aircraft as a thunderstorm, freezing rain, or the like, is wind shear. Pilots cannot see it and no radar can detect it. But at low altitudes, wind shear can cause rapid deterioration of aircraft performance.

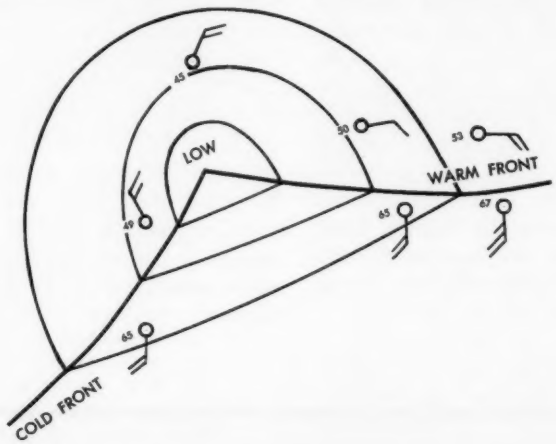
Flight recorder traces have shown altitude losses of more than 700 feet and airspeed fluctuations near 200 knots in less than a minute due to this phenomenon.

In order to avoid or minimize the adverse effects of wind shear on aircraft, pilots should know what it is, when and where it's likely to occur, and how to recognize it.

Wind Shear Defined

Before talking about how wind shear can upset the apple cart, a definition will help switch everyone to the same frequency. Wind shear is a change in wind direction and/or velocity within a short distance.

For example, variances in wind direction of as much as 180 degrees and velocity of 50 knots or more have been recorded within 200 feet of the ground. Wind shear may occur at any altitude—from the jet stream on down to the surface. At high altitudes, with airspeed margins well above stall and plenty of room for recovery, the effects of shear may be little more than a bout with turbulence. But the hazard of shear is much greater while flying close to the ground with aircraft fully config-



Differences across frontal zones.

ured. Knowing when and where wind shear is likely to occur and how to compensate for it can prevent untimely surprises and possible catastrophic results.

Conditions That Cause Shear

Thunderstorms, temperature inversions, and frontal activity contain elements that usually produce wind shear. Thunderstorms can produce intense shear in all quadrants up to ten miles ahead of cell activity. Shear gradients, wind velocities, and directional changes associated with cumulus activity are difficult to predict and are more reasons why pilots should give thunderstorm activity a wide berth.

Temperature inversions may also cause wind shear. For example, during the night, cool air may form and collect in valleys. After sunrise, warm air begins moving overhead; the velocity difference between the trapped cool air and the heated air above the valley generates wind shear. Aircraft taking off or approaching the valley airport may encounter turbulence and sudden changes in airspeed and pitch when passing through this transition zone.

Frontal activity is a leading producer of wind shear. What kind of frontal activity is likely to produce sharp shear gradients? Pilots can expect significant low level wind shear if the front (cold or warm) meets one or both of the following criteria:

1. The temperature differential across the front at the surface is 10 degrees F (five degrees C) or higher.
2. The front is moving at 30 knots or more.

When frontal activity exists which meets these conditions, comparing the wind direction and velocity on both sides of the front before taking off will help determine the shear potential and location.

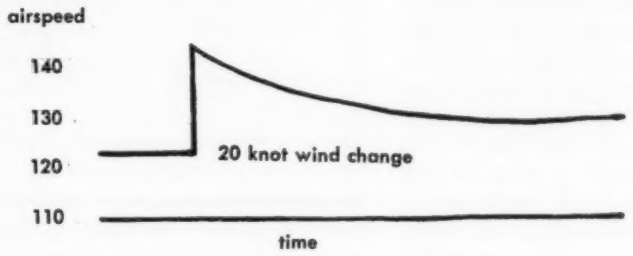
If you're en route to a base that is under the influence of a front, determine the directional difference between the runway winds and the wind aloft. Significant differences in direction and speed could spell trouble during takeoff or approach.

Aircraft Reactions and Pilot Precautions

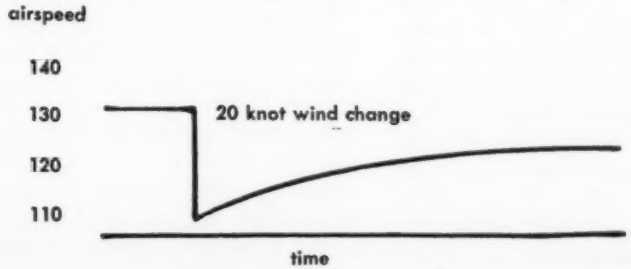
How does an aircraft react to sudden shear forces and what can pilots do to minimize or effectively counter shear?

Steady winds or winds that change gradually don't normally affect an aircraft — except for its drift and ground speed. But this is not true if the wind velocity changes faster than an aircraft can accelerate or decelerate.

Strong shear gradients may cause an aircraft to pitch up, due to headwind effect, as much as 25 degrees. If not forewarned, a pilot's natural tendency will be to trim out the added pitch. If he does, as the aircraft stabilizes in



Airspeed change with abrupt headwind increase.



Airspeed change with abrupt headwind loss.

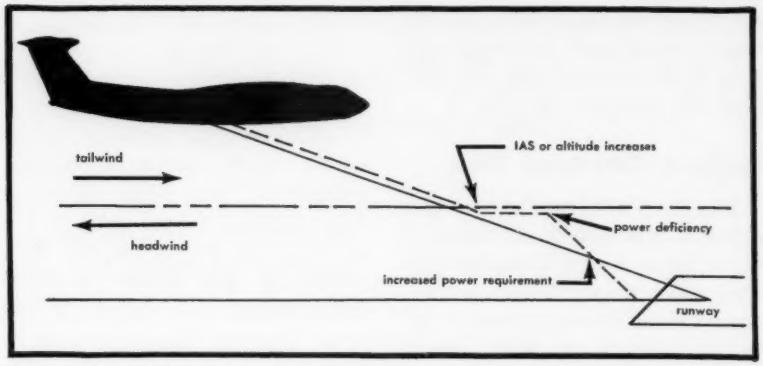
Shear Trouble

its new air mass, it will again be mistrimmed.

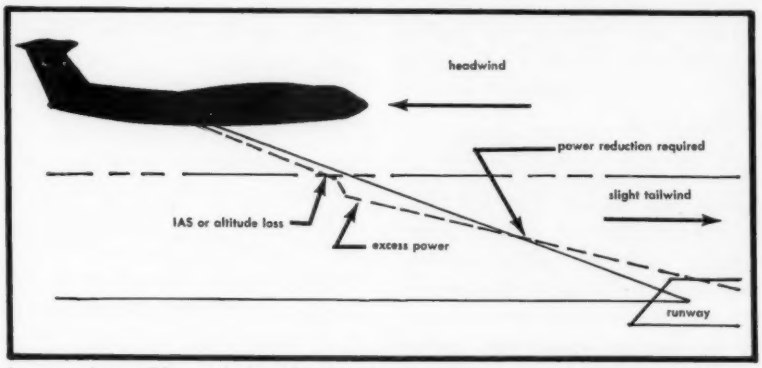
If an increasing tailwind or decreasing headwind is encountered after takeoff, the aircraft tends to pitch down and its indicated airspeed decreases abruptly. By increasing the throttle setting and not trimming out the nosedown tendency, you'll give the aircraft a chance to accelerate with the new air mass.

If wind shear is anticipated during departure, it may be wise to schedule and coordinate a departure route with ATC that will minimize the effects of shear. The route should be cut obliquely across the boundary zone between the contrasting air masses.

To minimize the adverse effects of wind shear during low altitude maneuvering, attempt to keep the "altitude" wind on the other side of the front from becoming a direct tailwind or headwind. For example, if takeoff is made to the north into a direct headwind of 30 knots and the 1,000-foot winds are 210 degrees at 10 knots, avoid flying a northeasterly departure course during the initial climb segment. Flying such a profile would lead to a performance-decreasing condition in which the strong headwind would abruptly shear out to a tailwind with a resultant airspeed loss of up to 40 knots.



Approach profile with tailwinds shearing out to a headwind condition.



Approach profile with headwind shearing out to a slight tailwind.

Approach Phase

When encountering a tailwind condition that shears into a calm or headwind condition on short final, power requirements to maintain approach speed will momentarily decrease — then quickly increase. If the pilot is slow to reapply power, abnormally high sink rates will develop and he may experience a hard landing or a flirtation with the approach lights.

In situations where strong headwinds shear out into calm or slight tailwind conditions on short final, thrust requirements will suddenly increase and airspeed will decrease for a moment while the aircraft stabilizes in the new air mass. Once this happens, the pilot will have to reduce power quickly to prevent a long, hot landing.

Convincing proof that such shear conditions do exist and can wreak havoc with today's modern aircraft is the following accident:

A DC-10, flying a coupled ILS

Aircraft Reactions During Wind Shear Penetration

Winds	Pitch Attitude	Thrust Requirements	Vertical Velocity	IAS
constant tailwind	decreased	reduced	increased	Vapp
constant headwind	increased	increased	decreased	Vapp
constant tailwind shearing out to headwind	will increase	reduce then increase	will decrease	initial increase then reduction to Vapp
constant headwind shearing out to tailwind	will decrease	increase then reduce	will increase	initial reduction then increase to Vapp

auto-throttle approach, entered a zone in which the rate of descent increased insidiously. During a descent from 1,000 to the surface on final, the wind changed from an effective 23-knot tailwind to a four-knot headwind. This increased descent rate came at a critical point in the approach at which the captain was transitioning from autopilot flight control in IMC conditions to manual control with visual references. The wide-bodied jetliner contacted the approach light piers 500 feet short of the runway threshold, struck an embankment, became airborne for another 1,200 feet, landed, and skidded 3,000 feet down the runway. Both main gear sheared, the fuselage ruptured, and fire broke out. A successful emergency evacuation followed.

Investigators reported that the captain's ability to detect and arrest the increased rate of descent was hindered because he was not aware of the wind shear and only marginal visual cues were available.

A likelihood of shear during an approach should prompt an aircraft commander to alert his crew to such an encounter. The copilot should closely monitor power, pitch, attitude, airspeed, and especially vertical velocity. On aircraft equipped with inertial and doppler navigation equipment, the navigator can continuously compare surface wind reports with doppler/INS wind readouts for shear indications. Checking doppler/INS ground speed comparisons with true airspeed against surface headwind and tailwind components is an additional method of measuring the shear potential.

Here are a few flying techniques that could prove helpful during approaches through shear zones:

Runway length permitting, consider a lesser flap setting and a correspondingly higher approach speed. This will provide a controllability cushion during shear transients. Refrain from coupling the auto-throttle system during an automatic approach if wind shear is anticipated; auto-throttle reaction may be unable to keep pace with abrupt changes in air mass velocity and direction. Remember, wind velocity and direction may change faster than an aircraft can accelerate or decelerate. If shear is anticipated, consider using manual throttles.

Most hazards are compressed into the first few and last few minutes of flight. Low level wind shear is no exception. It can trip up a crew as surely as forgetting the flaps, extending the spoilers prematurely, or landing gear up. Understanding the causes of wind shear and how to avoid its effects can help you overcome this potential hazard.

References

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"NTSB Assays Iberia Accident at Logan," *Aviation Week and Space Technology*, 7 Apr 75

"Shear — Transparent, Troublesome, and Tenacious," THE MAC FLYER, Feb 73

Telling It...

Most of us tend to take the printed word for granted, including what we see printed on airways charts, en route supplements, and letdown plates. And most of the time this may be okay. But there are times when even the printed word should be questioned.

An excellent case in point occurred recently when a United Airlines captain discovered a serious discrepancy on an approach plate for O'Hare runway four left. The error could have caused a pilot to make an excessive rate of descent and come within 40 feet of an obstruction at one point during the approach. The error had been introduced into the system and was never detected at any of the control points along the way. But once this alert pilot detected it, he notified the company flight manager at O'Hare who, in turn, checked with Jeppesen and confirmed that the error was made when the instrument procedure was designed.

Within 20 minutes after the pilot notified the flight manager, an order went out to pilots cancelling the ILS approach.

This incident provides a perfect example of what flight safety is all about and shows what effect safety awareness can have on the environment in which we operate.

Air Force crew members have a vehicle, the Hazard Report, for reporting most hazards, but there is no substitute for personally reporting an obviously critical situation to someone who will do something about it.

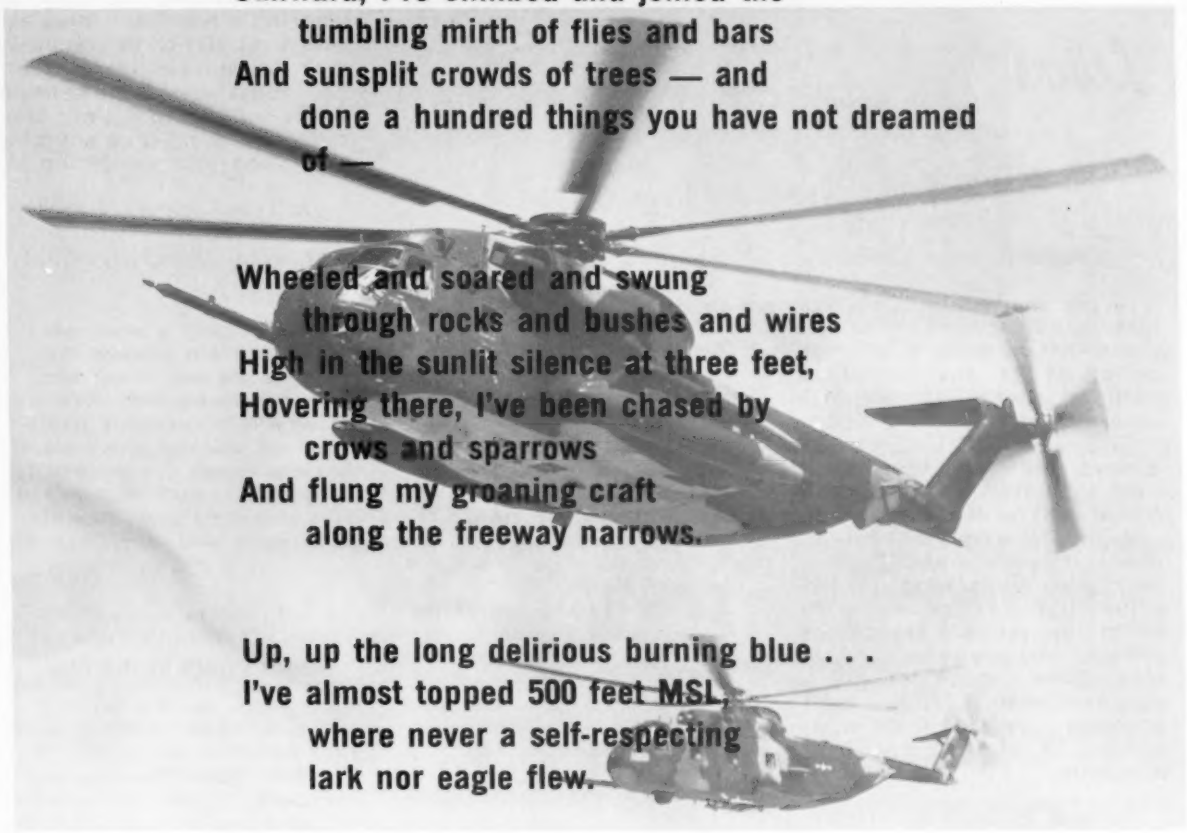
We're not advocating that you by-pass the Hazard Report, because in the long run that's the most effective weapon we have for reporting hazardous situations.

But don't delay reporting an unsafe condition one way or another. It may be inconvenient in some areas of the world to communicate with the proper personnel, but without a little extra effort, the hazard you discovered may never become known until it traps one of the unwary.

Like It Is

Oh, I have barely slipped the muddy
clutch of earth
And thrashed the skies on dusty,
untracked rotor blades.

Sunward, I've climbed and joined the
tumbling mirth of flies and bars
And sunsplit crowds of trees — and
done a hundred things you have not dreamed
of —



Wheeled and soared and swung
through rocks and bushes and wires
High in the sunlit silence at three feet,
Hovering there, I've been chased by
crows and sparrows
And flung my groaning craft
along the freeway narrows.

Up, up the long delirious burning blue . . .
I've almost topped 500 feet MSL,
where never a self-respecting
lark nor eagle flew.

And, while with silent lifting mind
I've trod . . .
The low, smoggy ambience of space,
Put out my hand, and searched for FOD.

—Anonymous

Low Flight

Letters To The Editor

Questions Good Taste

In my many years of military service, I have never felt compelled to write a letter to an editor of any periodical until I read your February 1975 issue of THE MAC FLYER.

THE MAC FLYER has always been regarded as a superior safety-oriented periodical, and for that I congratulate you. However, I found the poem on pages 16 and 17 offensive and demeaning to the pride that we are trying to build in today's force of officers who are rated navigators. Even though the poem was written by a fellow nav, I question your good taste in including it in a professional magazine.

Eugene D. Scott, Col, USAF
Commander
47th Air Division (SAC)
Fairchild AFB, Wash.

***Thank you for taking the time to convey to us your views on the poem, "A Boy Called Nav." Sorry that you found it offensive. Certainly, it was intended to be neither demeaning nor derisive. But we realize that individual tastes differ.**

Wings of Thought

An airplane crashed today,
Somewhere, somehow.
The names of the dead, of course,
Were withheld, pending.

This time a friend of mine
Might have been aboard,
And for a few days I'll not know
What kind of wings he's wearing.

I walk through the rain,
Dry to my senses,
And through the dark, a double light
Cries out in vain, searching.

One thing only does the melting
Of raindrops make certain;
Every time a plane goes down,
A part of me dies, too.

Terry R. Lowe, Capt, USAF
53 MAS
Norton AFB, Calif.

Old Hard Hat

I just have one comment about the January 1975 article about flight safety by Col McCullar ("For Fools and Second Lieutenants"). I have read your magazine since 1971, when I first entered AFROTC. I figured that to be a good pilot one must associate himself with a safety-minded attitude.

I read with interest the helicopter articles, as I have applied for helicopter training upon my graduation in May. I enjoyed the aforementioned article, but I just have one question about the picture on page 21.

The picture of the crew of the H-53 shows the pilot not wearing a helmet. I thought it was a regulation or something that the helicopter crew members must wear their helmets.

I'm not saying it's my place to tell the Air Force anything, but I was just wondering.

William Tracey, Cadet
AFROTC
Loyola University, Calif.

***Your question is quite valid and we're a little surprised that you were the only reader who queried us about it. Both AFR 60-16 and AFM 35-10/MACSUP 1, require that helicopter crew members wear helmets. One reason for using the photo was to illustrate a main point of the story — that of discipline.**

Night Flyers in the Sky

The attached ballad is for your possible use in THE MAC FLYER. The original author is unknown. (This is therefore not an entry in your TMF flying safety writing contest.)

I acquired the ballad when I served at Da Nang in 1972 with the last tactical electronic warfare squadron (TEWS) in RVN. This ballad is about their mission.

I feel the ballad contains an overall theme in keeping with the spirit of TMF, and certainly everyone will infer his own safety message from it, while hopefully being entertained.

If you should decide to publish this ballad, my only request is that it be dedicated to those who served. Thank you.

(to the tune of "Ghostriders")

We hail and hardy crewmen, on a dark and stormy night,
Took our Electric Gooney on a seven-hour flight.
No threat of loss could stop us, the priority was high,
We had to fill that great big square, way up in the sky.

Yippee-ai-a, yippee-ai-o,
That square up in the sky.

We flew our first two hours and the Goon was running strong,
But in another hour, the machine was running wrong,
An engine was shut down and it was thought that we should try,
To RTB, and leave that square, way up in the sky.

We radioed to Cap Control to see just what to do,
And Cap came back with words that everyone aboard well knew,
You've got to stay up there, Cap said, there is no reason why,
Be sure to fill that great big square, way up in the sky.

Yippee-ai-a, yippee-ai-o,
That square up in the sky.

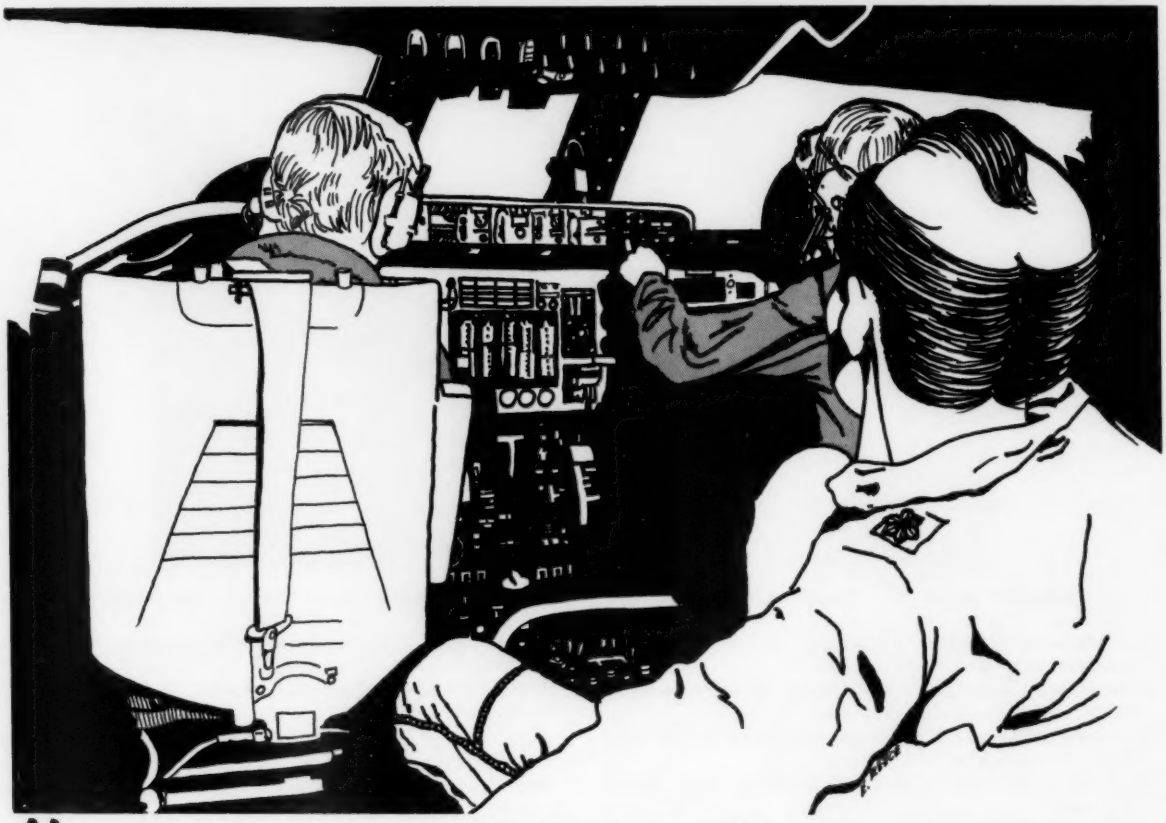
Our woes began to multiply, the outlook turned to gray,
The empennage and fuselage were ripped by Triple A,
Why don't we call up Cap Control and see if we can try,
To get out of this awful square, away up in the sky?
We radioed to Cap Control to see just what to do,
Our worst felt apprehensions subsequently turned out true,
Well, boys, we know you're troubled, but you're still three hours shy,
So stay up there and fill that square, away up in the sky.

Yippee-ai-a, yippee-ai-o,
That square up in the sky.

We made one final call to Cap, apologetically,
We've lost both of our engines and we're gliding out to sea,
Well, tell our wives and mothers not to fret if we should die,
We fought to fill that great big square, away up in the sky.
The crew was safely rescued and was none the worse for wear,
Another call from Cap Control came singing through the air,
A plane is waiting ready just as soon as you are dry,
To take you back and fill that square away up in the sky.

Yippee-ai-a, yippee-ai-o,
That square up in the sky.

Derek L. Duke, Capt, USAFR
301 ARRS (AFRES)
Homestead AFB, Fla.



Not a bad takeoff, m'lads, and a tolerable climbout. A bit off your heading but, all in all, a compliment to the outstanding instructional technique of your teacher," grinned the Master Manipulator as the Starlifter leveled off at cruise altitude.

The Pudgy Pilot, secure in the sanctuary that only a jump seat can offer a third pilot, had not stopped talking since the Starlifter's engines whined to life on the parking ramp. C. R. relished his "unofficial" role as flight examiner, a role which assumed even more significance considering that he wasn't even an instructor pilot.

The Starlifter was cruising at .74 mach, its engines purring smoothly as the two young pilots cleaned up checklists and completed radio calls to center.

"Gee, boss," gulped Sam from the left seat, "that's the first time I ever took off without an aircraft commander in one of the seats. I didn't know they had changed the rule on that."

"Rules are for the uninitiated, Sam, m'boy. When will you youngsters ever learn that regulations are for guidance. Look in the front of any Dash One and it'll tell you that. Haven't been reading your books lately, I see," grinned the Terror of the Airways, easing the throttles forward.

"If you laddies don't get with it, you're gonna cause us to spend Christmas up here," the Master Manipulator complained to his copilots. "Why, in my heyday, we flew faster than this on final.

"Sir, we're limited to .74 at cruise," commented Sergeant Torque, quickly gulping down a cup of coffee at C. R.'s unanticipated action.

"Don't worry, Sarge. Even jet engines need cleaning out occasionally, and this is the best way to do it," announced C. R.

"But, Sir, the EPR —"

"And speaking of martinis, if we don't get on the stick, you guys are gonna make me miss Tassel's act in San Francisco to-

C.R. TERROR

night. Her on-stage act, that is, hee, hee."

"Well, we wouldn't want that to happen, Sir, but I still don't feel right about going so fast. We're supposed to run into some turbulence anytime now, and I wouldn't want to hit it at this speed," complained Sammy.

"Tut, tut, tut, never you mind. Just concentrate on the problem at hand," chided his boss, "and I'll do the thinking from the jump seat."

Sammy glanced apprehensively toward the right seat at Fred, the third pilot. Both of them shrugged their shoulders in bewilderment.

"You gonna let Sammy and me land again, Sir," quizzed the right-seater, who was becoming a little apprehensive as the five-day trip with the Terrorific Twosome neared its climax.

"Gotta get you guys trained sometime. No time like now. Just mind the store. I'll be back in a minute," answered C. R. He pulled off the headset and edged back toward the cargo compartment. "I'll bring you that cup of coffee now, Blinky," he said as he squeezed past the navigator's seat.

"Thanks, Sir. But I think you'd better hurry back. I just had contact with Metro and a 727 just ahead of us reported moderate turbulence 4,000 feet below us."

C. R. sauntered leisurely toward the cargo compartment ladder, forced his bulk slowly down the steps and put in his order. "Ah, Sergeant Downs, two cups of your special brew of java. One black and one heavy on the cream and sugar. Incidentally, how's our cargo of special handling passengers holding up?"

"Just fine, Sir. Did you know that one is General Fang? One of the sergeants told me that he's been out looking at some of the bases in the system."

C. R. perked up. "Is he traveling alone? Surely he has his Boy Friday with him. Never saw a general yet without an aide running around trying to impress everybody."

"I think that major is his aide, Sir," replied Sergeant Torque, "the one in the flight suit sitting in the third row."

C. R. walked unobtrusively down the aisle to see if he could recognize the General's aide. In less than a minute he was waddling rapidly up the aisle toward Sergeant Downs.

"What's wrong, Sir? You look like you've seen a ghost. You feeling okay?" asked the loadmaster.

"Worse than that," puffed the World's Greatest MAC pilot. "It's not the General's aide. It's Major Mac Zaminer from 83d Air Force. Out in the system to harrass the troops again, no doubt. Bet he'll try to give me a check ride before it's all over. And just when I'm about to come down with a flu bug."

"Sir," broke in Sergeant Downs, "Captain Sammy just called and said for everybody to strap in for expected turbulence. I'll be strapping in myself in a minute."

With considerable physical exertion, The Aviator with Avoirdupois hoisted himself awkwardly up the ladder and into the crew compartment, gripping a cup of steaming coffee in each pudgy hand.

"Sir, please strap in," implored the navigator. "We're expecting some pretty bad turbulence any time now. We thought you had strapped in back in the cabin."

"Ah, me. You youngsters just haven't learned to keep your cool,"

C.R. TERROR

smiled C. R. benevolently. "Why when I was a hot jock for the Hurricane Hunters we really had cause for concern. But not in clear air at three-zero and — whooaaaaahhhh!"

C. R. lost his balance and lunged forward as the aircraft suddenly plummeted downward, reversed itself, and shot skyward again. Plunging forward over the control pedestal, C. R. let loose of both cups, sloshing coffee all over himself, the control panel, and the other two surprised pilots. As he plunged headlong toward the instrument panel, the Master Manipulator grabbed a handful of throttles to cushion his fall. The ear-piercing whine of four firewalled engines wailed throughout the aircraft. Meanwhile, sparks shot from the control panel as the coffee seeped through the top of the panel and shorted out electrical circuits.

"Halp, yeeow, I'm electrocuted," shouted C. R. The aircraft lurched again and sent him sprawling helplessly into the left seat on top of Sammy, who was struggling frantically to reach the throttles. As the yoke dipped forward, the whine of the overboosted engines was joined by the beeping of the overspeed warning system. Sammy finally reached the throttles as the mach indicator passed through .84. He raised the nose to slow the bird and C. R. rolled off the seat onto the cockpit floor as the noise subsided.

"Ohhhh, I'm dying," moaned the Master of Wires and Tires. "Declare an emergency. Call out the nurses. Both legs are cracked. I feel hot blood running down my chest and I've been electrocuted."

In a few minutes the Starlifter had made its way through the turbulence and C. R., now resting on the bottom crew bunk, had again become the center of attraction.

"Sir, you're not bleeding — that's coffee you feel running down your chest," comforted Sammy. "And you don't seem to have been electrocuted. But your ankle is badly swollen."

"Thanks, Sammy, m'lad. This reminds me of the time I was flying in 'Nam," recounted the Silver Tongued Aviator, his confidence returning. "Why we took enough shrapnel to — "

"Major, is there anything that I can do to assist?" It was Major Mac Zaminer, out of the cabin

and into the cockpit. "That's a pretty bad looking ankle there, and I doubt that you'll be able to fly in your condition. I don't know what happened up here, but that was one of the roughest rides I've ever experienced. The general wants a full report after we land."

"Merely a day's work for us working troops, Major," returned a miffed C. R., rising from his prone position. "Ohhh, ahhh. I guess I need a little more rest than I thought," he muttered after taking one step on his ballooning ankle.

"Can't imagine how that could have happened, Major Terror. You were strapped in, weren't you? We all got the word in the back," replied Major Mac Zaminer.

"Well, you see, it was like this. I had to go back to be sure the passengers were strapped in. Didn't make it back up in time. Not my fault, though," insisted the Master Manipulator.

"I see. Well, I'm a qualified C-141 flight examiner and will be happy to take the left seat. We have to get you down and to a hospital. I think your ankle is broken," commented Major Mac Zaminer. "Captain Sammy, call the Travis Ops Center and tell them what has happened and that we'll be landing shortly. I'll take the left seat, you the right."

"Oh, you don't have to do that, Sir," replied Long Suffering Sam. "Fred and I have been making all the landings, anyway. We can handle it."

"You have what?" asked Major Mac Zaminer incredulously.

Sammy bit his lip and glanced sheepishly at his boss who was now cringing either in pain, regret, or both.

"Ah, kind of an in-house training program," C. R. defended.

"We'll talk about that later, Major Terror," pledged the flight examiner. "Right now, I am taking command of the aircraft."

* * *

"Gee, Boss," apologized Sammy as he shut the ambulance door and sat down beside C. R.'s stretcher. "I didn't mean to cause you any more trouble. I hope the wing commander isn't too hard on you when he visits tonight."

"Never you mind, Sammy boy. You done good, flying and all. Things have a way of taking care of themselves, anyway," consoled the Prelate of Prophetic Pronouncements, "But be sure and give Tassels a call for me. Wouldn't want to spend these couple of freebee days here without her."

"Sure, Boss. Boy, do I admire your spunk. I just don't see how you can see any silver lining in all of this," observed Sammy.

"Well, if we keep our eyes and ears open, we can learn something new every day," C. R. philosophized uncharacteristically.

"Ah, yes, Sir. But what did we learn today that we didn't already know?" questioned Sammy.

"For one thing," grinned the Champion Rationalizer, "we should never drink coffee on an airplane. And second, we found out that Mac Zaminer can actually fly an airplane and, as expected, his meager skill doesn't approach the expertise of yours truly."

"But then," sighed Sammy, "whose does?"

Quick Stoppers

Rotor Damper Departs

After a half hour of flying, the CH-53 suddenly shuddered, began a moderate one-to-one lateral beat, and its tip path plane became erratic. The pilot reduced airspeed from 115 knots. Suspecting a damper malfunction, he kept 102 percent on the rotor r.p.m. and made a shallow approach and a run-on landing.

In the chocks, as the rotor r.p.m. coasted down — thunk — the rotor damper separated from the rotor, damaging the head. When maintenance personnel crawled up to take a look, they found that the pin used to secure the spanner nut to the damper had sheared, allowing the nut to back off and the damper to separate from a blade. When the rotor coasted down, the blade had swung forward where its spindle assembly had contacted the vertical hinge pin lug area. The result: a rotor head change.

Hydroplaning Herk

For you pilots who think the T-39 has a corner on the hydroplaning market, here's a case of a C-130 suffering the same malady during a crosswind landing on a wet runway.

Number four engine lost power on takeoff and the crew shut down the faulty engine and returned for landing. The reported weather was 1,200 foot overcast, light rain and snow, with a ten-knot left crosswind.

The pilot made a normal touchdown, but on rollout, after he pulled the throttles to the ground idle position, wind and water hampered aircraft control. The aircraft hydroplaned and weathervaned; although the pilot applied full rudder, nosewheel steering, right brake, and asymmetrical power, he was unable to stop the sliding aircraft. It departed the runway and ended up in the grass.

Maintenance fixed the mechanical problem with a prop change. It was too late to affect the landing problem, but the crew's unit set up a special briefing on crosswind operations on a wet runway with a downwind outboard engine shutdown.

Coffee Handling

A recent incident involving spilled coffee serves to remind us of some important aspects of hot liquid handling aboard aircraft. In this case, a large coffee urn fell off its stand during takeoff roll and scalded three crew members. Two men received second degree burns and the third man suffered first degree burns. Improper securing of the urn was identified as the cause of the unscheduled hot baths.

While coffee jugs jumping out of their racks are not common in MAC aircraft, other hazardous incidents can occur when serving hot coffee. The old rule to hand a cup of coffee to the pilot from the outboard side of his seat could prevent accidental spilling on the center console — and the electrical fire that could result. A corollary to this is that handing hot coffee to the pilot during turbulence could bring him right out of his seat should he get a lapful.

The name of the coffee game is "caution" — use it and help prevent the aircraft commander from getting hot under the collar.

Near Catastrophe

A C-141 heading northeast toward Turkey at flight level 370 and an El Al Boeing 747 cruising toward Israel at the same flight level came within 200 feet of locking horns recently. Moments before the near miss, the C-141 crew repeatedly called the approaching FIR with no success. Finally, the FIR controlling agency responded and issued climb clearance to flight level 380 to the MAC flight. A few seconds after receiving the clearance, the MAC crew spotted the 747 on a collision course. Both crews initiated immediate evasive maneuvers.

Later, representatives of the FIR that failed to answer the C-141's repeated calls stated that an adjacent FIR had failed to pass along the C-141's flight progress.

So what can you do while flying in the Mideast? Use extreme caution, follow the traffic rules to the letter, and keep all eyes in the cockpit searching outside when in the most likely areas of conflict.

Didn't Get the Word

Tower cleared the C-141 for takeoff. As the big bird crossed the barrier cable strung across the runway, the cable sprang upward and clipped the lower VHF antenna from the fuselage. After-the-fact investigations revealed some interesting conclusions as to why the cable hit the antenna.

Cable maintenance personnel had dropped the ball. They had not notified tower that they'd be adjusting tension on the cable; so, tower cleared the aircraft for takeoff without realizing the cable was a hazard to aircraft rolling over it.

This incident also emphasizes the need for flight crews to inform tower of unreported workmen spotted near the runway. It could be that tower hasn't gotten the word.

QS

A Hairy Incident

Just after the "pull chocks" signal was given, a young airman spotted fluid on the nose steering unit of the jet. The pilot was given a hold signal, and the airman headed for the nose steering unit to take a closer look. As the airman passed forward and below the left intake, the engine began vibrating and then stalled. It was immediately shut down and the crew deplaned.

What had caused the engine malfunction may be a first in FOD history. The airman who had passed near the intake was a young female, and the foreign object that entered the engine was her wig.

— HOT LINE

Eat Breakfast, Folks

Twenty minutes after takeoff, the first officer, suffering abdominal pain and nausea, left the flight deck. A short time later he returned but suffered another attack of vomiting.

The captain directed "pilot incapacitation procedures" and the ill pilot was made as comfortable as possible for the remainder of the flight. After an uneventful landing, the stricken officer was taken to the medical center for examination where the physician made the following observations: The pilot had a slight digestive weakness, had eaten only a light breakfast that morning, and his blood sugar level was low. His condition probably was aggravated by hyperventilation after he became ill. The doctor recommended that the officer develop regular eating habits and have a fairly substantial breakfast before flying.

Seems like good advice to MAC aircrew members, too.

Near Miss

An HH-53 was doing its thing in the helicopter training area near the runway. A T-39 approached the field under IFR, and its pilot transitioned to VFR as he received radar vectors toward the runway. While searching for the runway and looking up a tower frequency in one of his publications, the pilot entered the VFR traffic pattern on the wrong side of the runway — in the helicopter training area.

An alert scanner in the chopper sighted the oncoming Sabreliner and quickly relayed this to his pilot. The Jolly Green pilot entered autorotation and avoided a possible mid-air collision.

"See and be seen" continues to be the rule but the problem can be complicated by cockpit confusion. The confusion in this case was caused by untimely frequency searching and unfamiliarity with the traffic pattern. Preplanning can often remove confusion — and the mid-air potential — in an airport environment.

Drop That Pencil

Most flashlight batteries are made of graphite and zinc. The chemical reaction between these two elements produces electricity. But a by-product of this process is corrosion.

You knew that, didn't you? But you might not know that you can re-create that same electrolytic experiment by writing on exposed aluminum aircraft skin with a common graphite pencil. In fact, an aircraft inspector once drew a pencil line around a crack in an aircraft's aluminum wing skin. Two months later the crack wasn't a problem. The whole disc had fallen out!

If you must write on an aircraft skin — and in most cases, you don't have to — use a grease pencil.

— THE PACAF PROFESSIONAL

after deadline . . .

ARTCC INTO THE WEATHER FORECASTING BUSINESS -- That's right! There's going to be an important addition to services provided by the Kansas City Air Route Traffic Control Center to pilots passing through its area of responsibility. On 2 June 1975, six Air Force Air Weather Service forecasters and one civilian National Weather Service forecaster assume their new jobs with Kansas City Center. They will begin working with Center controllers to provide weather assistance to pilots transiting the Kansas City Center area.

The new concept of operations, which will be on a test basis for the first year (Jun 75 - May 76), will encompass weather monitoring and interpretation of weather data from radar and Pireps to provide Center controllers with current hazardous weather advisories. These ARTCC forecasters will also assume nighttime flight weather briefing and PMSV functions for Scott, Richards-Gebaur, Whiteman, and McConnell Air Force Bases and Marshall Army Air Field, Kansas. PMSV assistance from Kansas City Center will be available on UHF frequency 369.9. This new concept will be monitored continuously, and revisions to service will be made as necessary. If this test is successful, weather service from all ARTCCs may become a way of life. Check FLIP publications for further details.

NEXT MONTH -- Feature articles next month include:

* Winners of the 1975 MAC Flying Safety Writing Contest will be announced and the winning entry will lead off the July issue.

* The Cape Beverly Incident -- Three men, marooned far out at sea in a 12-foot lifeboat, face increasing odds of never setting foot on land again.

* The C-130 Fin Stall Phenomena -- As rugged, reliable, and versatile as the venerable Herky Bird is, it can still cause anxious moments in the cockpit.

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Touch and Go